

Sentence semantics

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Larger units of meaning: compositionality

- In utterances and sentences, many words are used together
- one standard approach to sentence semantics says that the meaning of a sentence consists of
 - the meanings of the morphemes and words, plus
 - the ways they are combined (in terms of morphosyntactic rules)
 - examples
 - *the lion licked the tiger* ≠ *the tiger licked the lion*
 - *he took his vorpal sword in hand* →
 - *he took his sword, which was vorpal, in hand*
 - *it was in his hands that he took his vorpal sword*
- this approach assumes **compositionality**: the meaning of the whole (sentence) is a function of the meaning of its parts and their patterns of combination

Larger units of meaning: utterances, sentences, and propositions

- Commonly, we make a distinction between utterances, sentences, and propositions
 - **utterances**
 - any stretch of talk by one person before and after which there is silence on the part of that person
 - physical ephemeral events
 - **sentences**
 - a string of words put together by the grammatical rules of a language
 - in the language of truth conditions
 - for **declarative sentences**, you must understand **truth conditions**
 - for **interrogative sentences**, you must understand **answerhood conditions**
 - for **imperative sentences**, you must understand **compliance conditions**
 - abstract grammatical entities

Utterances, sentences, and propositions

- Commonly, we make a distinction between utterances, sentences, and propositions
 - utterances
 - sentences
 - **propositions**
 - descriptions of states of affairs, which can be expressed with different sentences that differ in terms of their grammar and/or information structure
 - *Caesar invaded Gaul*
 - *Gaul was invaded by Gaul*
 - *It was Gaul that Caesar invaded*
 - propositions may even be identical in different sentence types
 - *John made the sorbet*
 - *Did John make the sorbet?*
 - *John, make the sorbet!*

The parts of propositions

- Propositions consist of two kinds of things
 - predicates
 - what is said about something
 - often instantiated by verbs and adjectives
 - arguments
 - what something is said about
 - often instantiated by noun phrases, but also clauses (*John said what he had wanted to say*)
 - predicates are often distinguished in terms of the number of arguments they (typically) require
 - *sleep* and *die* are one-place predicates
 - *have*, *eat*, and *see* are two-place predicates
 - *give* and *sell* are three-place predicates
- below, we will look at what gets inserted into the places

What the predicates do: situations, scenarios, ...

- Languages allow speakers to describe a variety of different **situation types**
- situation types are often viewed as being based on three dimensions
 - **+static vs. -static** (= dynamic)
 - *static* describes events that involve no internal changes
 - *Mary loved to surf* (static) vs. *Mary learned to surf*
 - **+durative vs. -durative** (= punctual)
 - *punctual* describes events that seem so instantaneous that they involve virtually no time (and speakers conventionally do not focus on the internal structure of the event)
 - *John coughed* (punctual) vs. *John worked*
 - **+telic vs. -telic** (= atelic)
 - telic processes have a natural completion
 - *John was gazing at the sea* - if interrupted: *John gazed at the sea*
 - *John was building a raft* - if interrupted: **John built a raft*

what the predicates do: situations, scenarios, ...

- The most widely used classification of situation types is the one by Vendler (1967)
 - **states**
 - +static, +durative
 - do not take progressives or imperatives easily
 - e.g., *desire, want, love, hate, know, believe*
 - **activities** (unbounded processes)
 - -static, +durative, -telic
 - e.g., *run, walk, swim, push a cart, drive a car*
 - **accomplishments** (bounded processes)
 - -static, +durative, +telic
 - e.g., *run a mile, walk to school, grow up, recover from illness*
 - **achievements** (point events)
 - -static, -durative, +telic
 - e.g., *recognize, find, stop, start, reach the top, win the race*

what the predicates do: situations, scenarios, ...

- The classification in terms of the binary features does not exhaust the space of possibilities
- proposed alternative/complementary situation types
 - **semelfactives** (instantaneous atelic events; e.g., *knock, sneeze*)
 - -static, -durative -telic
 - with durative adverbials, these get an iterative reading
- it is not always obvious how a given situation should be classified
 - *John is sleeping* = activity?
 - *John is sleeping* = state?

What the arguments do: an inventory of semantic/thematic roles

- Arguments can take on various kinds of so-called **semantic or thematic or participant roles**
 - **agent**: the person deliberately carrying out an action
 - *John* cooked the pasta or *The prisoner* escaped
 - **patient**: the thing upon which an action/event/process is carried out and that undergoes a change of state as a result of that
 - He cut back *the bushes* or She broke *the window*
 - **theme**: an entity moving / being located / changing state of possession, ... but which does not change
 - He passed *the ball* wide or *The book* is in the library
 - **experiencer**: the animate entity experiencing something or receiving sensory input
 - *John* likes books or *John* feels sick or *Mary* saw the smoke
 - **beneficiary/recipient**: the entity benefitting from an action/event/process (maybe in the form of receiving something)
 - Joe gave *her* a puppy or Joe passed the letter on for *her*

What the arguments do: an inventory of semantic/thematic roles

- Arguments can take on various kinds of so-called **semantic or thematic or participant roles**
 - **possessor**: the person who has something
 - *Joe has a puppy*
 - **instrument**: the thing by means of which an action/event/process is carried out
 - *John was injured with a stone*
 - **causative**: the natural force that brings about a change
 - *John was injured by a stone*
 - **percept**: an entity being perceived
 - *The general inspected the troops*

what the arguments do: an inventory of semantic/thematic roles

- Arguments can take on various kinds of so-called **semantic or thematic or participant roles**
 - **temporal**: the time at which an action/event/process occurs
 - *It is cold in Detroit in **the winter***
 - **location**: the location at which an even/action/process occurs
 - *It is cold in **Detroit** in the winter*
 - **source**: the location from which an action/event/process originates
 - *He drove from **Detroit** to Ann Arbor*
 - **goal**: location to which an action/event/process is directed
 - *He drove from Detroit to **Ann Arbor***

Semantic/thematic roles and grammatical relations

- Semantic roles are not affected by **grammatical relations** (but cf. next slide)
 - *the boy opened the door with a key*
 - *the boy* = agent
 - *the door* = patient/theme
 - *the key* = instrument
 - *the key opened the door*
 - *the door* = patient/theme
 - *the key* = instrument
 - *the door was opened*
 - *the door* = patient/theme
- but the semantics of verbs (as predicates) can be defined by the roles they take
 - *die* takes an experiencer (or theme or patient?)
 - *eat* takes an agent and a patient
 - *give* takes agent, a theme, and a beneficiary/recipient

Semantic/thematic roles: cross-linguistic aspects

- Languages differ with regard to
 - which semantic roles can be which grammatical relation
 - in English, all these can be subjects: AGT, PAT, INST, CAUS, EXP, BEN/REC, LOC, TEMP, and dummy *it* – other languages are more restrictive
 - which grammatical relations can be which semantic role
 - in English, LOC can be all this: subj, direct object, indirect object, oblique
 - how thematic roles are expressed
 - in English, often semantic roles are marked by prepositions
 - in Finnish, often semantic roles are marked by case
- universal subject hierarchy
 - AGT > REC/BENE > THEME/PAT > INSTR > LOC

Semantic/thematic roles: problems

- How do we delimit the set of semantic roles?
 - Fillmore (1968) started out with only six roles ...
 - Agentive: animate instigator of event
 - Instrumental: inanimate force/object involved in event
 - Dative: the being affected by the event
 - Factitive: the object/being resulting from the event
 - Locative: the location/spatial orientation of the event
 - Objective: everything else
- how do we decide which semantic role to assign?
 - *She received a gift of flowers*
 - *she* = AGT? *she* = BEN/REC? *she* = GOAL?
 - *He entered the room*
 - *he* = AGT? *he* = THM?
- how do we define semantic roles?

Truth values of propositions

- Propositions can be
 - empirically (synthetically)
 - true
 - *Joe Biden is the current POTUS* (uttered on 5 Jan 2021)
 - false
 - *Joe Biden was the first POTUS*
 - linguistically (analytically)
 - true
 - *bachelors are male*
 - *Either it is raining or it is not*
 - false
 - *Everybody is sick but John is not sick*

Truth relations between propositions

- Two important truth relations that can hold between two propositions p and q: presupposition and entailment

- entailment

- p entails q if the truth of q follows necessarily from the truth of p: it is not possible to think of any circumstances in which p is true and q is not
- p entails q when the truth of p guarantees the truth of q and the falsity of q guarantees the falsity of p:

$$p \rightarrow q \text{ and } \neg q \rightarrow \neg p$$

- *John regrets studying math* -ent-> *John studies math*
- *John regrets studying math* !-ent-> *John likes math* (!=not)
- *John assassinated the emperor* -ent-> *The emperor is dead*
- *John bought a dog* -ent-> *John bought an animal*

Truth relations between propositions

- Two important truth relations that can hold between two propositions p and q: presupposition and entailment
- presupposition
 - p presupposes q when q follows from both the truth and the falsity of p: $p \rightarrow q$ and $\neg p \rightarrow q$
 - *The current king of France is bald* -presupp-> *There is a current king of France*
 - *John realized his car was stolen* -presupp-> *John's car was stolen*
- presupposition triggers
 - definite descriptors and cleft sentences
 - factive verbs (e.g., *regret* or *realize*)
 - judgment verbs (e.g., *blame*)
 - change of state verbs (*begin* or *start*)
- but presuppositions can be sensitive to context
 - *She cried before she finished her thesis* -presupp-> *She finished her thesis*
 - *She died before she finished her thesis* !-presupp-> *She finished her thesis*

Truth relations between propositions

- On the basis of entailment, we can also define other truth relations
 - **paraphrase = mutual entailment**
 - p is a paraphrase of q if p entails q and q entails p : $p \text{ -ent-} \rightarrow q$ and $q \text{ -ent-} \rightarrow p$
 - *John and Mary are twins -ent- \rightarrow Mary and John are twins*
 - *Mary and John are twins -ent- \rightarrow John and Mary are twins*
 - often actives and passives are paraphrases, but not always (*Everyone in this room speaks two languages*)
 - **contradiction**
 - p contradicts q if p and q cannot be true at the same time: $p \text{ -ent-} \rightarrow \neg q$
 - *John has a car and John doesn't have a car*
 - **anomaly**
 - *this idea is red* is anomalous because (*idea* = abstract), but red \rightarrow (*idea* = concrete)